



Lat 39.09268 Lon -122.75216

United States
Department Of
Agriculture

Forest
Service

Shasta-Trinity
National Forests

Reply To: 3420

Date: February 7, 1989

Subject: Biological Evaluation of Dwarf Mistletoe Units,
Upper Lake Ranger District (Report No. N89-1)

To: Forest Supervisor, Mendocino National Forest

On January 23, 1989, Dave Schultz, Entomologist, and I visited with Glenn Westlund, Acting TMO, and Nancy Gard, Reforestation Forester, Upper Lake RD. The purpose of the visit was to examine stands infested with dwarf mistletoe and determine what actions might be available for these situations.

STAND 1

The first stand is in T. 14 N., R. 8 W., section 4. It is a ponderosa pine plantation with pole and small sawtimber size trees. Plantation age is 25 to 30 years. One side of the plantation abuts private land. We examined a pocket of western dwarf mistletoe (Arceuthobium campylopodum) in a part of the plantation. The pocket is a few acres in size and the infection level is light to moderate in individual trees. The infestation extends into the pines on the private land.

Two concerns were expressed about this situation. First, is the dwarf mistletoe in the plantation adversely affecting the future of the stand. Second, does the dwarf mistletoe in trees on the private land serve as a future threat to the plantation.

The answer to the first concern depends on future stand management activities and expectations. If adequate height growth of the trees can be maintained, then dwarf mistletoe infections should not interfere with planned growth objectives. An annual height increment of at least 10 inches is necessary to provide adequate height growth. To accomplish this, stocking levels will need to be adjusted to a level appropriate to the site. Yield objectives may require reduction of the stocking below this level. Selection of leave trees should be based on crown characteristics, past growth performance, and spacing. Dwarf mistletoe eradication should not be an objective. At any particular spot, if there is a choice between an infected and uninfected tree of similar quality, then keep the uninfected. However, you can leave light to moderately infected trees if they are properly spaced with other leave trees and have good growth and other characteristics. Heavily infected trees (mistletoe ratings of 5 and 6) should be removed.

Trees on the adjoining private land are in a multiple layer stand structure. This provides some height differential with the plantation trees, a situation that increases the likelihood of infection of the upper crowns of some of the plantation trees. Although the trees on the private land are not excessively tall, nor do they have dwarf mistletoe infections high in their crowns, they can





serve as a source of mistletoe seed to plantation trees near the boundary. If suppression actions are taken in the plantation but not on the private land, then the District should try to minimize dwarf mistletoe infections from the overstory trees into the plantation. Because of the limited area affected by the private land, creating a buffer by removing some plantation trees would be appropriate. This buffer could include Road 15N09 which runs through the plantation near the private land. There is a small pocket of infected trees between the road and the private land which could be removed. This area would then serve as an adequate buffer to protect the plantation. Regenerating Douglas-fir and rust-resistant sugar pine in this area might be successful.

MANAGEMENT ALTERNATIVES

1. NO ACTION. The plantation will continue to grow, although the rate will slow as intertree competition increases. With decreasing height growth, the dwarf mistletoe will intensify in the crowns of infected trees. It will also slowly spread into uninfected parts of the plantation. Infections high in trees on the private land may aid in the intensification process as they send seed into the upper crowns of the plantation trees. The high stocking levels combined with dwarf mistletoe will reduce tree vigor and increase the chance for successful insect attacks and subsequent tree mortality. Mortality levels can be expected to increase during periods of below normal precipitation. In addition to pockets of mortality, trees will become suppressed and the time until they reach merchantable size will increase.
2. PRECOMMERCIAL THINNING. Stocking would be adjusted to levels appropriate to the site and planned objectives. Selection of leave trees would be based on spacing, dominance, growth characteristics, and dwarf mistletoe. Mistletoe infections would not override the other criteria. This operation should be done throughout the plantation and not just in the mistletoe infected area. If the uninfected parts of the plantation are not treated, then mortality levels can be expected to increase because of increased competition and tree stress. Thinning of a stand of this size class could result in a significant insect problem from pine engraver beetles (*Ips* spp.) if the slash is not treated properly. Several options are available for slash treatment, but the objective is to reduce the size of the slash and increase its rate of drying. Options include removing it from the site to an area where it will not present a hazard, chipping, or bucking to 18 inch lengths and scattering in openings. Piling should be avoided unless there is surety that it will be burned within 6 weeks.
3. COMMERCIAL THINNING. A commercial entry would be planned for the earliest possible time when adequate volume is available. This would likely be at least another 20 years. The objective would be to promote growth and vigor of the residual trees and obtain an economic return from the operation. During this time, growth rates would decline and tree stress would increase. Bark beetle-related mortality can be expected. Dwarf mistletoe would intensify in infected trees further reducing their vigor. It would also continue to spread into uninfected parts of the plantation.

The thinning should be aimed at reducing stocking levels and the level of dwarf mistletoe. The more heavily infected trees should be removed even if they do





not meet merchantability standards. Care should be taken to remove the minimally merchantable trees and not the largest and best growing individuals.

4. GROUP SELECTION. The infested area could be treated as a 2-3 acre stand and cleared, then replanted. This would remove the dwarf mistletoe as long as some treatment was done to stop its reintroduction from the private land. The distance dwarf mistletoe could spread into the new plantation from this source would increase because of fewer barriers blocking the seeds with the removal of larger trees. Unless infected trees on the private land along the boundary were removed, a buffer would be necessary to stop this reentry. Either part of the boundary of the plantation should not be planted or it should be planted with non-host species, such as Douglas-fir or rust-resistant sugar pine. This treatment would cost the 25-30 years of growth already in the infested area. It also would not have any effect on the overstocked conditions developing in the rest of the plantation. Treatment of the slash as in (2) above would be necessary to reduce the risk of pine engraver attacks in the rest of the plantation.

STAND 2

The second stand we visited is near Little Pinnacle (T. 15 N., R. 8 W., section 17). This is a natural stand of ponderosa pine which had an overstory removal several years ago. There are two adjacent areas with different size classes of trees. One area has pole to small sawtimber size trees, many of which are lightly to moderately infected by dwarf mistletoe. Snow breakage of the tops appears to be a common occurrence. The other area has seedling to sapling size trees in part of it and a landing in the rest. The trees are densely stocked. Many of these trees are heavily infected by dwarf mistletoe and are stunted and deformed.

At present, the larger trees are growing radially at acceptable rates. Height growth is being impacted by the snow breakage. Dwarf mistletoe does not appear to be adversely affecting these trees. Stocking levels are reaching the point where the rate of growth can be expected to slow and trees will become more susceptible to bark beetle attacks. Also, dwarf mistletoe will add to the reduction in vigor of these trees, further increasing their susceptibility to insects.

The regeneration-sized trees will not likely attain a merchantable size in the projected time. Even if they were thinned, the extent and intensity of mistletoe would continue to suppress them and new infections would continue to occur in their upper crowns from the adjacent taller stand. Any ponderosa pine planted in the landing would also be susceptible to infection by dwarf mistletoe from the adjacent stand.

MANAGEMENT ALTERNATIVES

1. NO ACTION. The area with the sapling-size trees will not attain projected yield estimates. Although commercial-size trees will develop, the length of time will be greater than if they were free to grow. The volume per acre will





also be reduced because of future mortality. Some of the trees will have bole deformities from dwarf mistletoe infections, reducing their value.

The larger trees will attain a commercial size, however, some mortality may occur as stocking increases. Dwarf mistletoe will slowly intensify in these trees further reducing their vigor. Tops will occasionally break out of some of the trees and reduce their height potential for the site. In some years, the broken tops may provide breeding habitat for pine engravers that emerge and attack the standing trees.

2. THIN AND REGENERATE. The larger trees would be thinned to the appropriate level to maintain growth and vigor. Spacing would be a primary criterion. Condition of the top would also be important. Dwarf mistletoe-infected trees would be removed whenever there is an option. Slash would need to be treated as discussed in (2) above to reduce the hazard of pine engraver attacks.

The area with the small trees and the landing would be site prepared and regenerated. A mix of non-host species (Douglas-fir and rust resistant sugar pine) should be planted adjacent to the infected, larger tree stand to minimize infection of the regeneration. Survival and growth of these species may not be as high as ponderosa pine because of the hot site. If ponderosa pine are planted up to the boundary with the infected stand, then the new trees along the boundary will become infected from above and will be stunted and deformed. Vegetation management and spacing control will be necessary during the early part of the rotation to maintain survival and growth. If tree growth is maintained, then the effects of any mistletoe infections will be reduced, except for those trees along the boundary that are being reinfected from above.

3. REGENERATE AND HARVEST. The landing and the area with the small trees would be site prepared and regenerated with ponderosa pine. Necessary cultural activities would be performed to maintain adequate growth. Ten years later many of the larger trees will be of merchantable size and can be harvested. All of the trees in this pocket should be removed, both merchantable and nonmerchantable, to minimize any additional spread of dwarf mistletoe into the adjacent regenerated stand. Following harvest, the area can be site prepared and planted with ponderosa pine and become part of the adjacent stand. It may be worthwhile at this time to examine the 10 year old stand for dwarf mistletoe. Infected trees could be removed and individual infected branches may be pruned to reduce the level of dwarf mistletoe and minimize spread and intensification.

CONCLUSIONS

Neither of these stands are ideal candidates for dwarf mistletoe suppression. Although the amount of dwarf mistletoe could be reduced in both stands, there are other factors and concerns that influence the decision to treat them. Both infestations cover a small area. Without the necessary cultural activities in the remainder of the stands, mainly thinning, the condition of the stands will deteriorate and negate much of the benefit of any mistletoe treatment. If these cultural activities are undertaken, then efforts to reduce the impact of dwarf mistletoe may be merited.





Forest Supervisor, Mendocino National Forest

5

Forest Pest Management funds are available for dwarf mistletoe suppression for these projects. These funds can only be used for direct suppression of dwarf mistletoe, such as pruning infected branches or felling infected trees. They cannot be used for general operations, such as thinning or regenerating sites. The District must submit three pieces of information to qualify for these funds. They must complete FS3400-2, Project Work Proposal; an environmental assessment, including a post-treatment evaluation plan; and an economic analysis. This office is available to assist the District in the completion of any of these requirements.

If there are any questions about this evaluation, please contact Dave Schultz or I at the Shasta-Trinity Supervisor's Office (916-246-5101).

GREGG DeNITTO
Forest Pathologist

